User Manual

Revision 1.006
English

CAN / CANopen - Converter

(Order Code: HD67042-A1, HD67042-A3, HD67042-A4)

for Website information:
www.adfweb.com?Product=HD67042-A1

for Price information:
www.adfweb.com?Price=HD67042-A1

Benefits and Main Features:

- Very easy to configure
- Low cost
- Electrical isolation
- Industrial temperature range:
  -40°C / 85°C (-40°F / 185°F)

HD67042-A1

For others Gateways / Bridges:

J1939 to Modbus

See also the following links:
www.adfweb.com?Product=HD67215 (Modbus TCP)

CANopen to Modbus

See also the following links:
www.adfweb.com?Product=HD67001 (Modbus RTU Master)
www.adfweb.com?Product=HD67002 (Modbus RTU Slave)
www.adfweb.com?Product=HD67004 (Modbus TCP Master)
www.adfweb.com?Product=HD67005 (Modbus TCP Slave)

For others Gateways / Bridges:
For **CAN bus 2.0A** and/or **CAN bus 2.0B** to **Modbus**

See also the following links:
www.adfweb.com?Product=HD67011 (Modbus RTU Slave)
www.adfweb.com?Product=HD67012 (Modbus RTU Master)
www.adfweb.com?Product=HD67014 (Modbus TCP Slave)
www.adfweb.com?Product=HD67015 (Modbus TCP Master)

Do you have an your customer protocol?
See the following links:
www.adfweb.com?Product=HD67003

Do you need to choose a device? do you want help?
Ask it to the following link:
www.adfweb.com?Cmd=helpme

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UPDATED DOCUMENTATION:

Dear customer, we thank you for your attention and we remind you that you need to check that the following document is:

- Updated
- Related to the product you own

To obtain the most recently updated document, note the "document code" that appears at the top right-hand corner of each page of this document.

With this "Document Code" go to web page www.adfweb.com/download/ and search for the corresponding code on the page. Click on the proper "Document Code" and download the updates.

To obtain the updated documentation for the product that you own, note the "Document Code" (Abbreviated written "Doc. Code" on the label on the product) and download the updated from our web site www.adfweb.com/download/

REVISION LIST:

Revision	Date	Author	Chapter	Description
1.003	10/07/2012	Dp	All	Revision
1.004	11/07/2012	Dp	All	Revision
1.005	26/03/2013	Nt	All	Added new chapters
1.006	05/11/2013	Dp	All	Revision

WARNING:

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ADFweb.com is not responsible for any error this manual may contain.

TRADEMARKS:

All trademarks mentioned in this document belong to their respective owners.

SECURITY ALERT:

GENERAL INFORMATION

To ensure safe operation, the device must be operated according to the instructions in the manual. When using the device are required for each individual application, legal and safety regulation. The same applies also when using accessories.

INTENDED USE

Machines and systems must be designed so the faulty conditions do not lead to a dangerous situation for the operator (i.e. independent limit switches, mechanical interlocks, etc.).

QUALIFIED PERSONNEL

The device can be used only by qualified personnel, strictly in accordance with the specifications.
Qualified personnel are persons who are familiar with the installation, assembly, commissioning and operation of this equipment and who have appropriate qualifications for their job.

RESIDUAL RISKS

The device is state of the art and is safe. The instrument can represent a potential hazard if they are inappropriately installed and operated by personnel untrained. These instructions refer to residual risks with the following symbol:

This symbol indicates that non-observance of the safety instructions is danger for people to serious injury or death and / or the possibility of damage.

CE CONFORMITY

The declaration is made by us. You can send an email to support@adfweb.com or give us a call if you need it.

CONNECTION SCHEME:

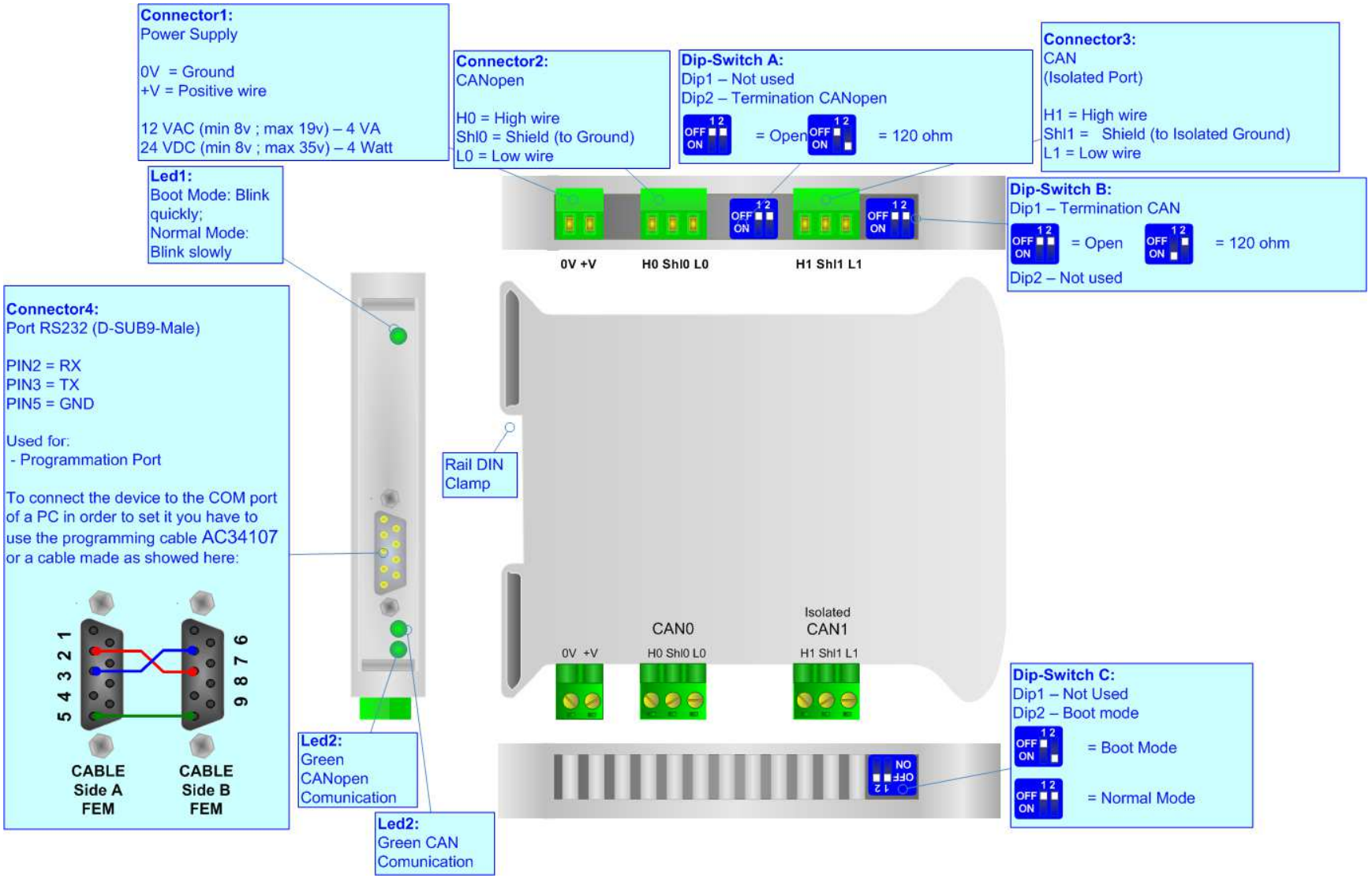


Figure 1: Connection scheme for HD67042-A1

CHARACTERISTICS:

The CAN / CANopen Converter allows the following characteristics:

- Two-directional translation of information between two distinct CAN Buses;
- Electrical isolation between two Buses;
- Filter of CAN frames;
- Temperature range -40°C to 85°C.

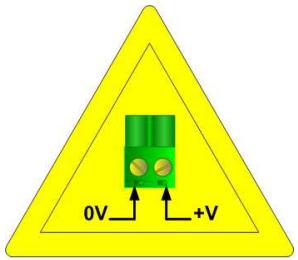
The CAN to CANopen Gateway must be used for interfacing two CAN lines. Otherwise, in order to extend the length and electrical isolation of more branches than CANopen line you must use CAN Repeater device (note: view PRODUCTS AND RELATED DOCUMENTS).

POWER SUPPLY:

Recommended Power Supply	
VDC	**VAC**
24v	**12v**

VDC		VAC	
Vmin	**Vmax**	**Vmin**	**Vmax**
8v	**35v**	**8v**	**19v**

Caution: Not reverse the polarity power.



HD67042

CONFIGURATION:

The "CAN / CANopen - Converter", allows a CAN network to communicate with a CANopen network.

You need Compositor SW67042 software on your PC in order to perform the following:

- Define the parameter of CAN;
- Define the parameter of CANopen;
- Define the SDO;
- Define the TPDO;
- Define the RPDO;
- Define which CAN frames are readable from the CANopen;
- Define which CAN frames are writable from the CANopen.

USE OF COMPOSITOR SW67042:

To configure the Gateway, use the available software that runs with Windows, called SW67042. It is downloadable on the site www.adfweb.com and its operation is described in this document.

When launching the SW67042 the right window appears (Fig. 2):

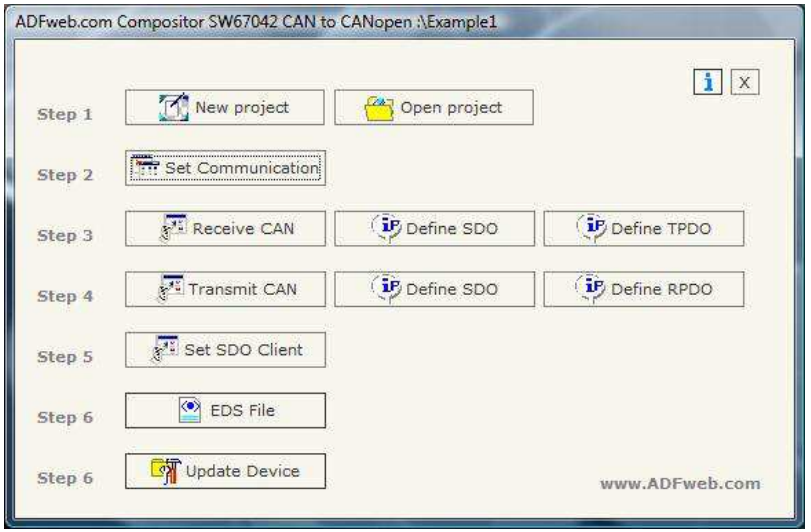


Figure 2: Main window for SW67042

The following explains the function of the buttons:

NEW PROJECT / OPEN PROJECT:

The "New Project" button creates the folder which contains the entire device configuration.
A device configuration can also be imported and exported:

- To clone the configurations of a Programmable CAN / CANopen Converter in order to configure another device in the same manner, it is necessary to maintain the folder and all its contents.
- To clone a project in order to obtain a different version of the project, it is sufficient to duplicate the project folder with another name and open the new folder with the button "Open Project".

When a new project is created or an existent project is open, it will be possible to access the various configuration section of the software:

- **Set Communication;**
- **Receive CAN;**
- **Transmit CAN;**
- **Define SDO;**
- **Define TPDO;**
- **Define RPDO;**
- **Set SDO Client;**
- **EDS File.**

SET COMMUNICATION:

This section defines the fundamental communication parameters of two Buses, CAN and CANopen.

By pressing the "Set communication" button from the main window of SW67042 (Fig. 2) the window "Set Communication" appears (Fig. 3):

- In the fields "Baud Rate", the velocity of the two buses are defined;
- Check the CAN Bus 2.0A (CobID 11Bit) if your CAN network use the Standard CAN protocol at 11 Bits, otherwise check the CAN Bus 2.0B (CobID 29bit) if your CAN network use the extended protocol at 29 Bits.
- In the field "Time out Data" insert a time, when this time is elapsed the data isn't reliable, and in the CANopen register you can read "00";
- In the field "ID Dev.", the CANopen address is defined.
- If the field "Set Operational State at Start-Up" is checked, when the device is switched on it goes in operational mode otherwise in pre-operational mode;
- If the field "Network Start at Start-up" is checked, when the device is switched on it puts in Operational Mode all the nodes presents on the network;
- In the field "Delay" insert a time, this time indicates how many seconds the gateway wait before sending the message of Start-up;
- If the field "Send on change data" " is checked, the Transmit PDO will be sended only if the data changed.
- If the field "Send cyclically" is checked, the Transmit PDO will be sended ciclicallywith a delay inserted in the edit box expressed in milleseconds.
- If the field "Enable SDO Client" is checked, is possible to send SDO request from the Converter to other devices in the CANopen network.
- In the field "TimeOut SDO", the TimeOut of the SDO request is defined. It is expressed in tenths of second.
- If the field "Enable NMT Service" is checked, is possible to send NMT request to the CANopen Slaves using a CAN frame.
- In the field "CAN Frame for NMT" is possible to select which CAN frame use for send the NMT request to the CANopen slave. For more info see the "NMT requests" chapter.

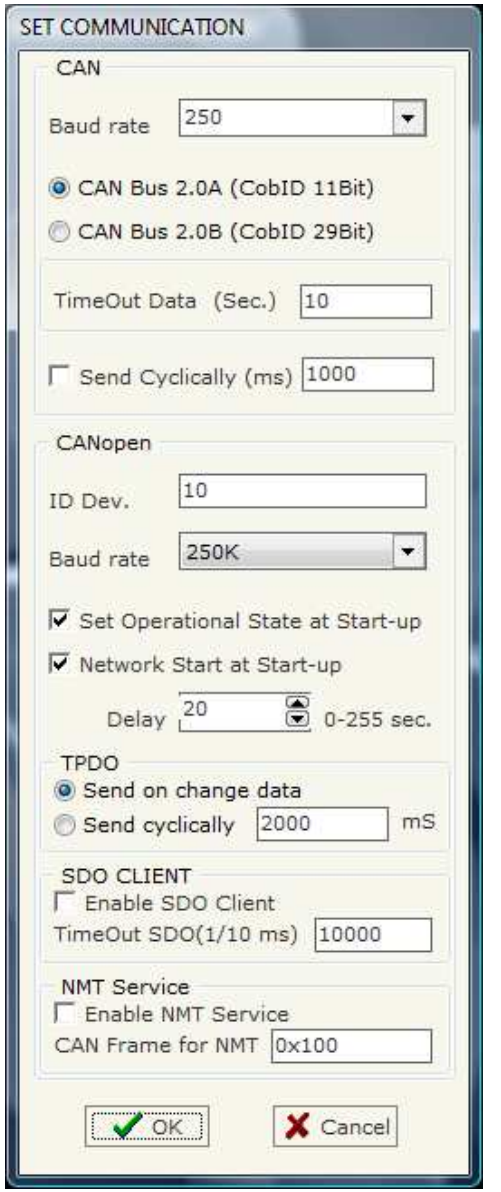


Figure 3: "Set Communication" window

RECEIVE CAN:

By pressing the "Receive CAN" button from the main window of SW67042 (Fig. 2) the window "Receive CAN frame" appears (Fig. 4):

In the right scenario:

- In the field "COB-ID" insert the Cob of the CAN Frame you would to read from CANopen;
- In the field "Dimension" insert the Dimension of CAN frame. It have to be between 1 and 8;
- If the field "Delete" is checked when the "Time Out Data" has expired in the CANopen side it is possible to read "0x00". It will indicate that this register is not reliable;
- In the field "Mnemonic" the description for the frame is defined.

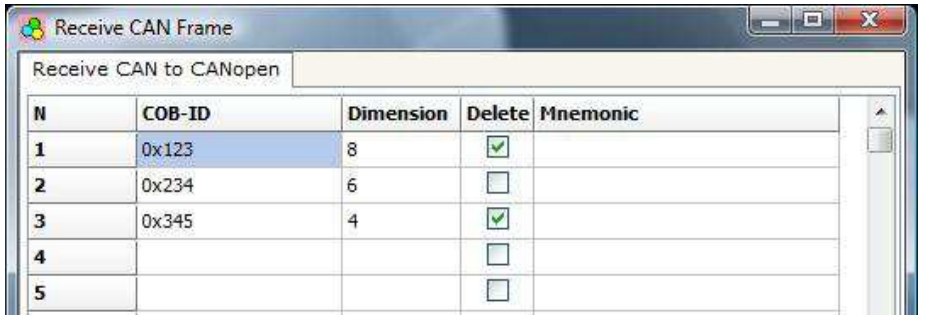


Figure 4: "Receive CAN frame" window

DEFINE SDO (Step 3):

By pressing the "Define SDO" button from the main window of SW67042 (Fig. 2) in "Step 3" the window "Receive CAN Frame Info SDO" appears (Fig. 5):

- In the field "Correlated" there are COB-ID and Dimension who you insert in the list (Receive CAN);
- In the field "SDO" there are the SDO frames;
- In the field "Index SDO" there is the address of the SDO;
- In the field "SubIndex SDO" there is the SubIndex of SDO;
- In the field "Dimension SDO" is possible to select the dimension of the SDO;
- Depending on the dimension of SDO it is possible to enter from one to four byte of CAN frame and then it is possible to set on that CAN Frame byte insert the SDO byte;
- With "Delete, New, Modify, Copy, Paste" buttons it is possible to delete, add, modify, copy and paste a SDO;

For example:

Click on the COB-ID, insert the valid Index, SubIndex and Dimension for the SDO, then select which bytes of the CAN frame map in the SDO bytes and click the "New" button for create a new SDO. In the field SDO appears the names of SDO (The first SDO is named IND SDO 0, second IND SDO 1, third Ind SDO 2 and so on).

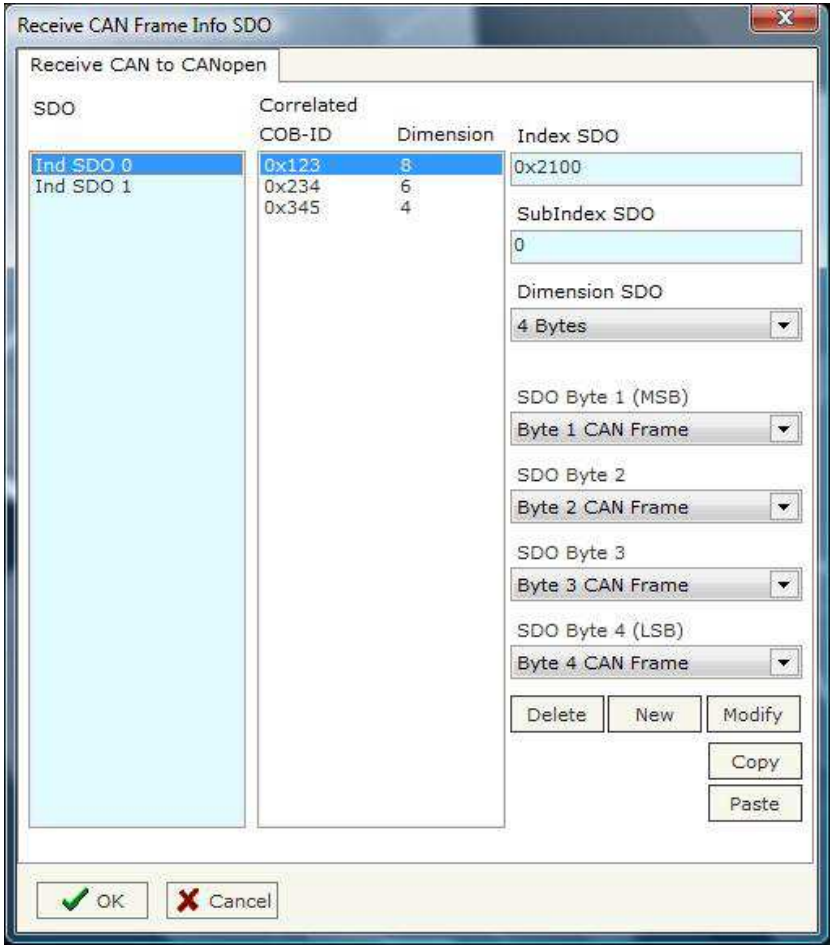


Figure 5: "Receive CAN Frame Info SDO" window

DEFINE TPDO:

By pressing the "Define TPDO" button from the main window of SW67042 (Fig. 2) the window "Transmit CAN Frame Info PDO" appears (Fig. 6):

- In the field "COB-ID" it is possible to insert the COB-ID of the PDO frame;
- In the field "CAN Frame" it is possible to select one of the CAN Frame created with the window "Receive CAN Frame";
- The Dimension of PDO is the same of the dimension of the CAN frame;
- If the field "Send on CAN" is checked, the PDO will be sent when the CAN frame arrive. If this option is checked the TPDO send option inserted in the Set Communication section are forgotten.
- In the field "Mnemonic" the description for the PDO is defined.

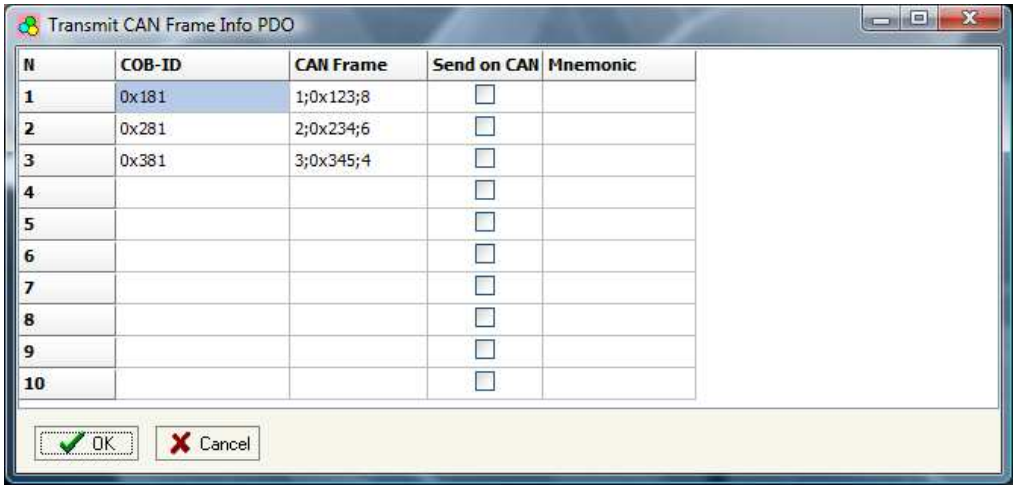


Figure 6: "Transmit CAN Frame Info PDO" window

TRANSMIT CAN:

By pressing the "Transmit CAN" button from the main window of SW67042 (Fig. 2) the window "Transmit CAN Frame" appears (Fig. 7):

- In the field "COB-ID" insert the COB-ID of the CAN frame you would to write from CANopen;
- In the field "Dimension" insert the Dimension of the CAN frame. This value have to be between 1 and 8;
- In the field "Mnemonic" the description for the frame is defined.

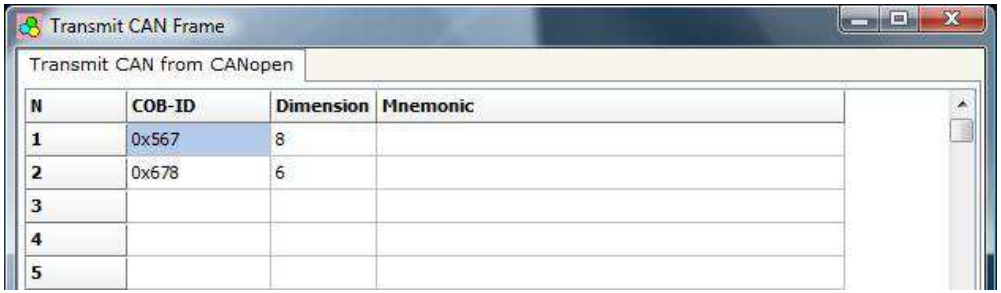


Figure 7: "Transmit CAN Frame" window

DEFINE SDO (Step 4):

By pressing the "Define SDO" button from the main window of SW67042 (Fig. 2) in "Step 4" the window "Transmit CAN Frame Info SDO" appears (Fig. 8):

- In the field "Correlated" there are DOB-ID and Dimension who you insert in the list (Transmit CAN);
- In the field "SDO" there are the SDO frames;
- In the field "Index SDO" there is the address of the SDO;
- In the field "SubIndex SDO" there is the SubIndex of SDO;
- In the field "Dimension SDO" it is possible to select how many byte insert in the SDO;
- Depending on the dimension of SDO it is possible to enter from one to four byte of the CAN frame and then it is possible to set on that CAN byte insert the SDO byte;
- In the field "Send Frame when write SDO" it is possible to select "False" for don't sending the CAN frame when write the SDO or selecting "True" for sending the CAN frame when write the SDO
- With "Delete, New, Modify, Copy, Paste" buttons it is possible to delete, add, modify, copy and paste a SDO;
- With "Export or Import" buttons it is possible to Export or Import an existing Project.

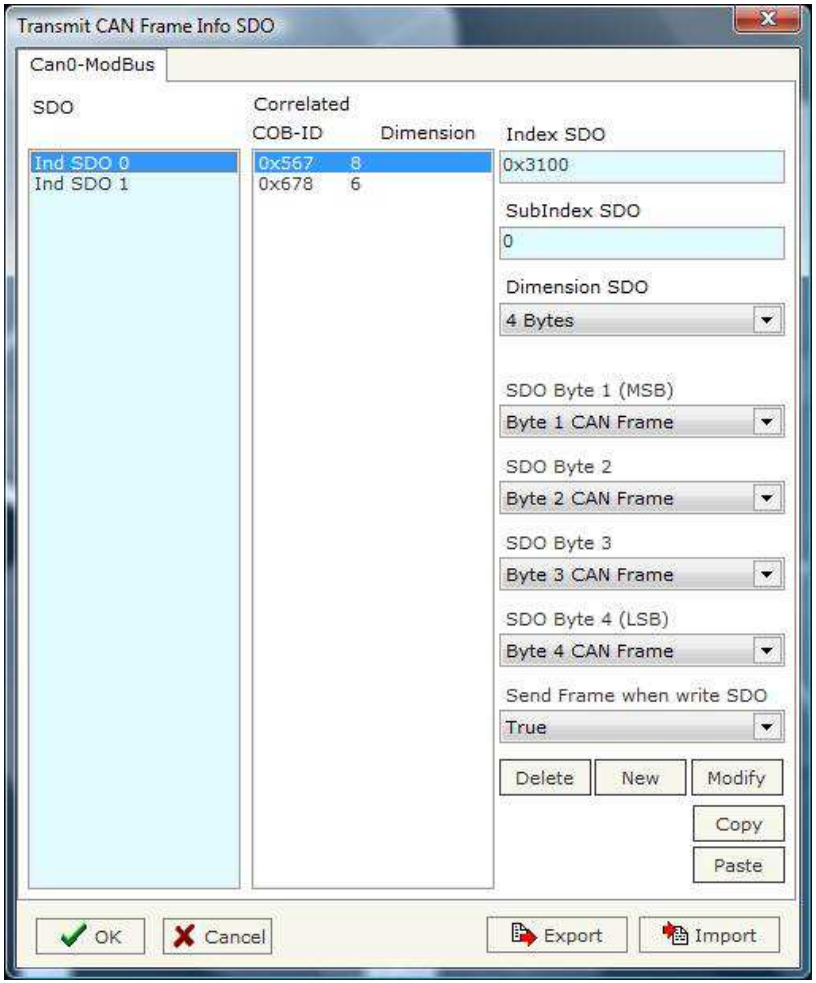


Figure 8: "Transmit CAN Frame Info SDO" window

DEFINE RPDO:

By pressing the "Define RPDO" button from the main window of SW67042 (Fig. 2) the window "Receive CAN Frame Info PDO" appears (Fig. 9):

- In the field "COB-ID" it is possible to insert the COB-ID of the PDO frame;
- In the field "CAN Frame" it is possible to select one of the CAN Frame created with the window "Transmit CAN Frame";
- The Dimension of PDO is the same of the dimension of the CAN frame;
- In the field "Mnemonic" the description for the PDO is defined

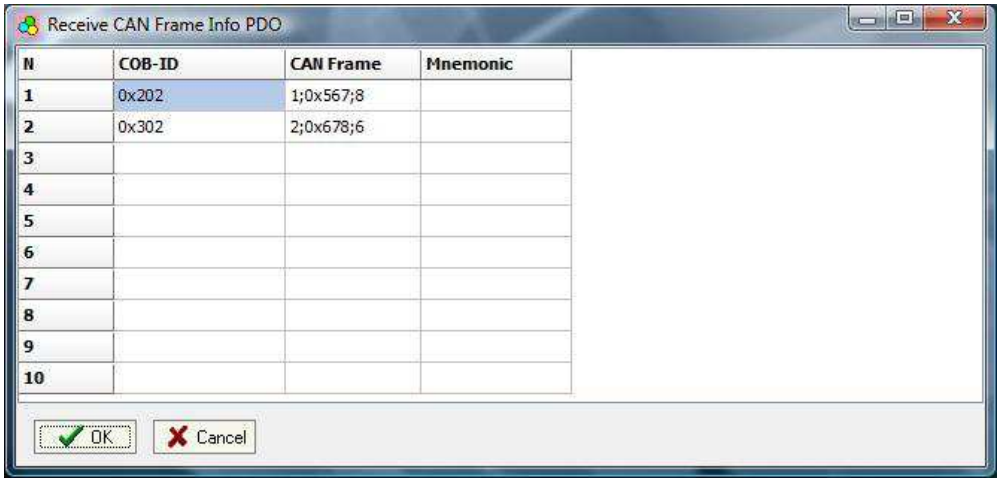


Figure 9: "Receive CAN Frame Info PDO" window

SET SDO CLIENT:

By pressing the "Set SDO Client" button from the main window of SW67042 (Fig. 2) the window "Set SDO Client" appears (Fig. 10).

In this window is possible to configure five CAN messages used to read and write SDO data from other devices in the network CANopen.

The first two frames are used to read a SDO, the last three messages are used to write a SDO.
All the CAN messages are 8 byte of data.

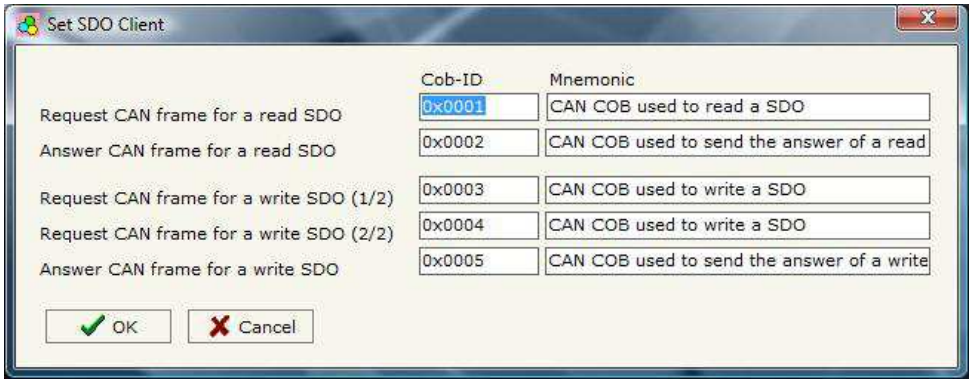

Set SDO Client
Cob-ID
Mnemonic
Request CAN frame for a read SDO
0x0001
CAN COB used to read a SDO
Answer CAN frame for a read SDO
0x0002
CAN COB used to send the answer of a read
Request CAN frame for a write SDO (1/2)
0x0003
CAN COB used to write a SDO
Request CAN frame for a write SDO (2/2)
0x0004
CAN COB used to write a SDO
Answer CAN frame for a write SDO
0x0005
CAN COB used to send the answer of a write
OK
Cancel

Figure 10: "Set SDO Client" window

READ SDO

Request frame CAN to read a SDO
When the gateway receive this message, it sends a read SDO request to CANopen network.
The coordinates of the SDO are inside the data bytes of the CAN message in this format:

Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
ID Device	Index	Index	SubIndex	Num Byte	Not used = 0	Not used = 0	Not used = 0

Answer frame CAN of a read SDO
The gateway sends this frame with the answer of the SDO.
The Data bytes of this message are so formed:

Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
ID Device REQ	Index REQ	Index REQ	SubIndex REQ	Data byte 1	Data byte 2	Data byte 3	Data byte 4

WRITE SDO

Request frame CAN to write a SDO (1/2)
When the gateway receive this message it save the coordinates of write SDO request.
The coordinates of the SDO are inside the data bytes of the CAN message in this format:

Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
ID Device	Index	Index	SubIndex	Num Byte	Not used = 0	Not used = 0	Not used = 0

Request frame CAN to write a SDO (2/2)
When the gateway receive this message it send the SDO write request in CANopen network.
The coordinates of the SDO are inside the data bytes of the CAN message in this format:

Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Not used = 0	Not used = 0	Not used = 0	Not used = 0

Answer frame CAN of a write SDO
The gateway send this frame when a Write SDO request finish correctly.
The Data byte of this message are so formed:

Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
ID Device REQ	Index REQ	Index REQ	SubIndex REQ	1	Not used = 0	Not used = 0	Not used = 0

EDS FILE:

By pressing the "EDS File" button it is possible to save the EDS file for the CANopen side.
With this feature you can save the configuration of the gateway of the CANopen side.

NMT requests:

To send a NMT request to a CANopen device is neccessary to send a CAN frame to the Converter with the COB-ID equal to the "CAN frame for NMT" setted in the "Set Communication" section. The frame must have at least 2 data bytes. The first byte is used to decide the NMT Request to send and the second byte is used to indicate the CANopen ID device where to send the NMT request.
The NMT Request that the gateway can send are (first byte of the CAN Frame):

Value	Description
1	Start Remote Node (Operationa state)
2	Stop Remote Node
128	Pre-Operational Remote Node
129	Reset Remote Node
130	Reset Communication

The CANopen ID Device (Second Byte of the CAN frame) can go from 1 to 127 for send a request to a single CANopen device or the value 0 to send a broadcast message.

UPDATE DEVICE:

Section "Update device Serial" (Fig. 10):
In order to load the parameters or update the firmware in the gateway, follow these instructions:

- Turn off the Device;
- Connect the Null Modem Cable Form your PC to the Gateway;
- Insert the Boot Jumper (see the Fig. 1 for more info);
- Select COM port and press the "Connect" Button;
- Turn on the device;
- Press the "Next" Button;
- Select which operations you want to do. Can select only Firmware or only Project or both;
- Press the "Execute update firmware" to start the upload;
- When all the operation are "OK" turn off the device;
- Disconnect the Boot jumper;
- Disconnect the RS232 Cable;
- Turn on the device.

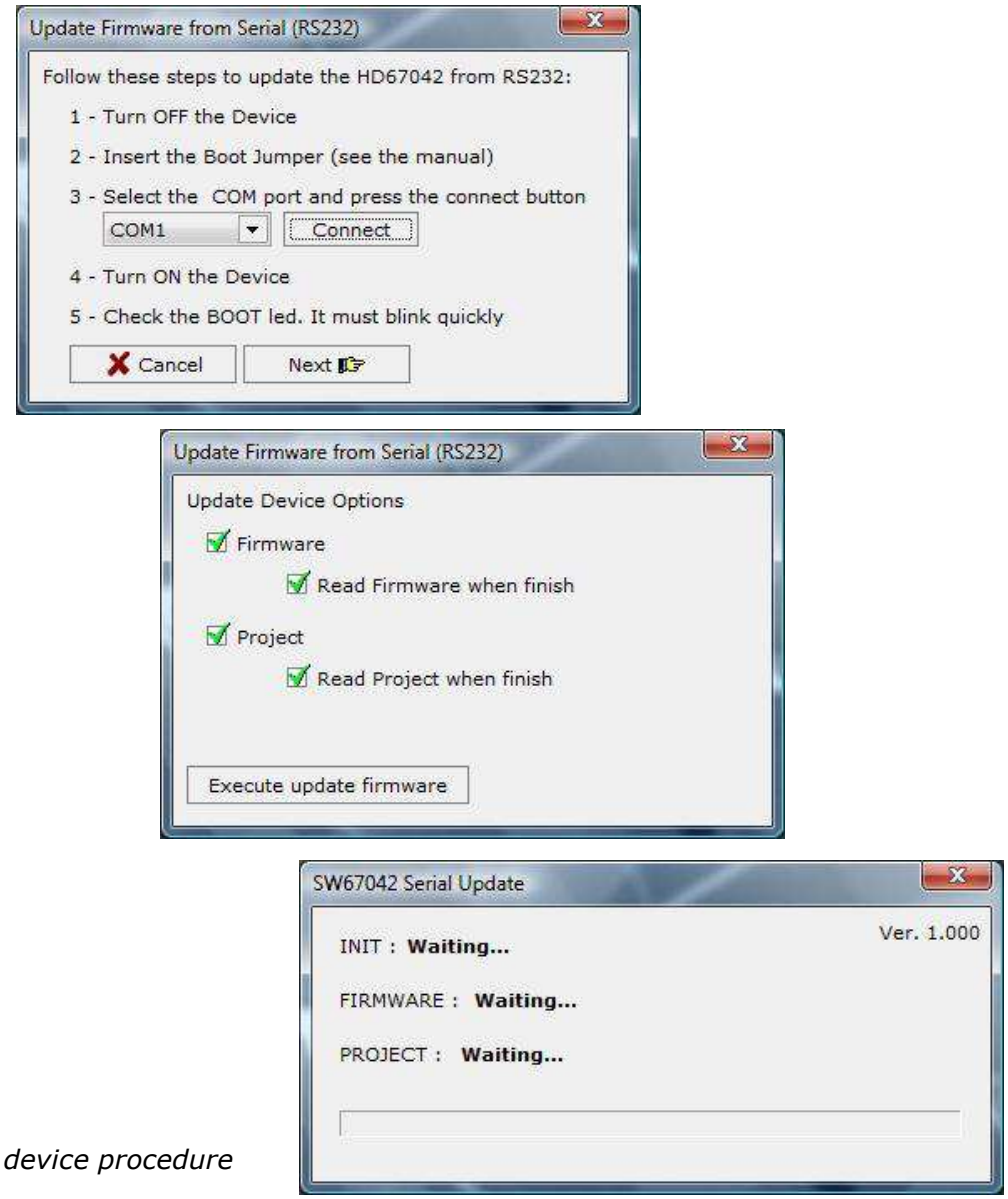

Update Firmware from Serial (RS232)
Follow these steps to update the HD67042 from RS232:
1 - Turn OFF the Device
2 - Insert the Boot Jumper (see the manual)
3 - Select the COM port and press the connect button
COM1
Connect
4 - Turn ON the Device
5 - Check the BOOT led. It must blink quickly
Cancel
Next
Update Firmware from Serial (RS232)
Update Device Options
Firmware
Read Firmware when finish
Project
Read Project when finish
Execute update firmware
SW67042 Serial Update
Ver. 1.000
INIT : Waiting...
FIRMWARE : Waiting...
PROJECT : Waiting...

Figure 11: Update device procedure

CHARACTERISTICS OF THE CABLES:

The connection from RS232 socket to a serial port (example one from a personal computer), must be made with a Null Modem cable (a serial cable where the pins 2 and 3 are crossed).
It is recommended that the RS232C Cable not exceed 15 meters.

MECHANICAL DIMENSIONS:

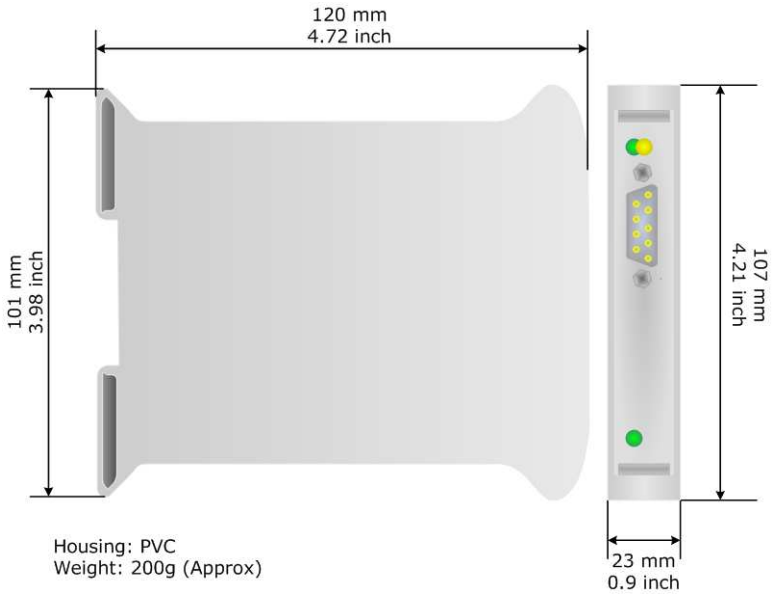


Figure 12: Mechanical dimensions scheme

ORDER CODE:

Order Code: **HD67042-A1** - CAN / CANopen - Converter
Order Code: **HD67042-A3** - CAN / CANopen - Converter
Order Code: **HD67042-A4** - CAN / CANopen - Converter

ACCESSORIES:

Order Code: **AC34107** - Null Modem Cable Fem/Fem DSub 9 Pin 1,5 m
Order Code: **AC34114** - Null Modem Cable Fem/Fem DSub 9 Pin 5 m
Order Code: **AC34001** - Rail DIN - Power Supply 220/240V AC 50/60Hz – 12 V AC
Order Code: **AC34002** - Rail DIN - Power Supply 110V AC 50/60Hz – 12 V AC

DISCLAIMER

All technical content within this document can be modified without notice. The content of the document content is a recurring audit.
For losses due to fire, earthquake, third party access or other accidents, or intentional or accidental abuse, misuse, or use under abnormal conditions repairs are charged to the user. ADFweb.com S.r.l. will not be liable for accidental loss of use or inability to use this product, such as loss of business income. ADFweb.com S.r.l. shall not be liable for consequences of improper use.

OTHER REGULATIONS AND STANDARDS

WEEE INFORMATION

Disposal of old electrical and electronic equipment (as in the European Union and other European countries with separate collection systems).
This symbol on the product or on its packaging indicates that this product may not be treated as household rubbish. Instead, it should be taken to an applicable collection point for the recycling of electrical and electronic equipment. If the product is disposed correctly, you will help prevent potential negative environmental factors and human health, which could otherwise be caused by inappropriate disposal. The recycling of materials will help to conserve natural resources. For more information about recycling this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE

The device respects the 2002/95/EC Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (commonly referred to as Restriction of Hazardous Substances Directive or RoHS).

CE MARKING

The product conforms with the essential requirements of the applicable EC directives.

WARRANTIES AND TECHNICAL SUPPORT:

For fast and easy technical support for your ADFweb.com SRL products, consult our internet support at www.adfweb.com.
Otherwise contact us at the address support@adfweb.com

RETURN POLICY:

If while using your product you have any problem and you wish to exchange or repair it, please do the following:

1) Obtain a Product Return Number (PRN) from our internet support at www.adfweb.com. Together with the request, you need to provide detailed information about the problem.
2) Send the product to the address provided with the PRN, having prepaid the shipping costs (shipment costs billed to us will not be accepted).

If the product is within the warranty of twelve months, it will be repaired or exchanged and returned within three weeks.
If the product is no longer under warranty, you will receive a repair estimate.

PRODUCTS AND RELATED DOCUMENTS:

Part	Description	URL
HD67121	Gateway CANopen / Canopen	www.adfweb.com?product=HD67121
HD67002	Gateway CANopen / Modbus - RTU	www.adfweb.com?product=HD67002
HD67004 HD67005	Gateway CANopen / Modbus – Ethernet TCP	www.adfweb.com?product=HD67004
HD67134	Gateway CANopen / DeviceNet	www.adfweb.com?product=HD67134
HD67117	CAN bus Repeater	www.adfweb.com?product=HD67117
HD67216	CAN bus Analyzer	www.adfweb.com?product=HD67216